Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Measles Vaccination and Epidemics in Mbujimayi, Democratic Republic of Congo : A Qualitative Study

Benoit Kazadi

benoitkm23@gmail.com

Université Officielle de Mbujimayi

Alain Mpanya

Institut Superieur des Techniques Médicales de Lubumbashi

Criss Koba

University of Lubumbashi

Désiré Baloji

Université Officielle de Mbujimayi

André Mutombo

Université Officielle de Mbujimayi

Pascal Lutumba

University of Kinshasa

Research Article

Keywords: Vaccination, Measles epidemics, Mbujimayi, Democratic Republic of Congo

Posted Date: September 4th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10279939/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Introduction : Measles is a highly contagious viral disease caused by a morbillivirus, primarily affecting children under five years of age. It remains a significant public health problem in our community, our province, and in many countries across Africa and the world, despite the availability of an effective vaccine. The overall objective is to contribute to reducing measles morbidity and mortality by documenting the factors that influence the persistence of measles in the community.

Methodology: Our qualitative study was conducted using semi-structured interviews with healthcare providers and focus groups with parents of children. Data analysis was performed using Atlas Ti software.

Results: The majority of parents are familiar with measles, its symptoms, transmission methods, and treatment; they also understand the importance of vaccination. Some parents believe that measles is a curse placed on the child and prefer traditional remedies. Healthcare providers recommend medical care and measles vaccination, adhering to the full vaccination schedule. Some religions reject vaccines in the name of their faith or miracles, ultimately creating pockets of resistance.

Conclusion : Support from the national and provincial health systems through the Expanded Program on Immunization (EPI) is essential. It is crucial to avoid non-compliance with the vaccination schedule, vaccine stockouts, and adherence to the cold chain.

SUMMARY

Measles is a highly contagious viral disease caused by a morbilivirus mainly affecting children under five years of age. This disease remains an ipmortant public health problem in our environment, province and in many countries in Adrica and in the world, despite the availibilyty of an effective vaccine. This study aims at reducing morbidity and mortality due to measles by documenting the factors that influence its persistence in the community.

Our study is qualitative and answers this main question : what would be the perceptions and perspectives of communities and health care providers, and which promote the persistence of measles epidemics.

Data from some urban health zones in MBM were collected, thanks to focus groups carried out with parents. Besides, the study also resorted to semi-structured interviews with health care providers in order to collect data. We carried out six focus groups and twenty-five semi-structured interviews.

The majority of parents know about measles, the signs of the disease, the mode of transmission and the treatmnent. They also know the importance of vaccination. Some of them think that this disease is caused by a bad fate cast on the child, thus prefering traditional treatment. Health care providrs recommend medical care and the taking of measles vaccine while respecting the entire vaccination schedule

Support from the National and Provincial health systems via the expanded vaccination program is necessary. Avoid compliance with the vaccination schedule and stock shortage in vaccination.

Introduction

Measles is a highly contagious disease caused by an RNA virus of the Paramyxoviridae family, genus Morbillivirus, and is still responsible for more than 100,000 deaths each year since the introduction of the vaccine. Before the introduction and widespread use of the measles vaccine, this number was over 2 million deaths per year (1).

Measles is a cosmopolitan disease; all continents are affected. According to the World Health Organization (WHO), supported by a publication from the Centers for Disease Control and Prevention (CDC), measles has increased significantly worldwide, with 869,770 cases reported globally in 2019, the highest level since 1996. The number of measles deaths worldwide has risen by nearly 50% since 2016, with an estimated 207,500 people dying from the disease in 2019 alone (2).

Preliminary WHO data indicate that the number of reported measles cases worldwide jumped by 300% in the first three months of 2019 compared to the same period in 2018 (3).

Measles outbreaks are widespread throughout sub-Saharan Africa despite preventive measures, including vaccination targeting children under five (4). In the Democratic Republic of Congo, from week 1 to week 38 of 2021 (ending September 26), 41,099 suspected cases of measles were recorded, including 991 confirmed cases and 603 deaths, in 369 health districts across the country's 26 provinces. The outbreak was confirmed in 82 health districts in 23 affected provinces, including the capital, Kinshasa (5).

In Kasai-Oriental, the Provincial Health Division (DPS) reported over 12,000 cases of measles, including 109 deaths, recorded in the province during 2022.

This epidemic is currently affecting 17 health zones in this province located in the center of the Democratic Republic of Congo ; it is selectively affecting children between the ages of 0 and 5 years (6).

Vaccination has largely contributed to achieving Millennium Development Goal 4 (MDG4), which aimed to reduce mortality among children under five (7). From 1990 to 2008, it helped reduce global child mortality by 23% (8).

The COVID-19 pandemic and the disruptions it caused have severely strained health systems: as a result, 23 million children did not receive the vaccinations they should have in 2020, 3.7 million more than in 2019—the highest figure since 2009 (9).

The persistence of measles virus reservoirs in countries with inadequate vaccination programs would explain the increased susceptibility of young children to the virus and the accumulation of cases among young adults. The fact that these young adults had to avoid both natural measles infection and the

measles vaccine (2009–2016) is the main reason. This resurgence has been observed in South America (Brazil), Africa (Madagascar), and even in the USA (New York State), where measles had been declared eradicated in 2000 (9).

The return of measles worldwide affects both rich and poor countries, not only countries at war (such as Yemen), but also countries experiencing serious political crises (such as Venezuela) and those with severe lack of access to healthcare, such as Madagascar and the Democratic Republic of Congo (10).

In addition to the factors mentioned above, the following factors contribute to the persistence of measles in the DRC : refusal of vaccination by certain religions, lack of knowledge, and ignorance, coupled with neglect and poverty. These factors would compromise the total eradication of the disease.

These various factors determining the occurrence of measles epidemics are very poorly documented in the city of Mbuji-Mayi in Kasai-Oriental. It is therefore necessary to better understand these perceptions and perspectives in order to contribute more effectively to the fight against measles.

Materials and Methods

Studying the Design

We conducted a qualitative cross-sectional descriptive study using interviews with healthcare providers and focus group discussions (FGD) with parents of children in five health zones in the Kasai-Oriental province of the Democratic Republic of Congo between July and August 2023.

The study was carried out in five health zones in the city of Mbuji-Mayi. These zones were selected based on their location, as they were the most affected by measles outbreaks in Kasai-Oriental. The five health zones in the city of Mbuji-Mayi are :

(1) Lubilanji Health Zone, (2) Nzaba Health Zone, (3) Lukelenge Health Zone, (4) Muya Health Zone, and (5) Kansele Health Zone (Figure 1).

Mapping of the city of Mbujimayi : visibility of health zones (figure 1) : The figure shows on the left all the health zones of the province of Kasai-Oriental in the DRC, and on the right the urban health zones of the city of Mbujimayi, in which six were chosen for our study**.**

Study Population

Our study included all targeted household heads living in the city of Mbuji-Mayi with children under five years old. It also included healthcare personnel (registered nurses). All participants were required to reside in the health zones covered by our study.

Sampling

There was no fixed sample size ; we conducted a total of six focus groups and twenty-five individual semi-structured interviews.

Data Collection Methods

The six focus groups and twenty-five semi-structured interviews were conducted. The focus groups were divided into three categories: In each health zone, we selected five registered nurses, including the head nurse of the general referral hospital (whose responsibilities include vaccination), for the semi-structured interviews, and two homogeneous focus groups of nine people each, including parents. We continued to hold focus groups in a particular health zone until the data saturation point was reached and no new information emerged (FGD).

TABLE OF CHARACTERISTICS OF FOCUS GROUPS AND INTERVIEWS

Z/S Lubilanji	Z/S Nzaba	Z/S Lukelenge	Z/S Muya	Z/S Kansele
• · 2FGD:1(Fe*) et 1(Ma**)	• 2FGD:1(Fe*) et 1(Ma**)	• 2FGD:1 (Fe*) et 1(Ma**)	–	–
			• 5INT*²	
• · 5 INT*².	• 5 INT*².	• 5 INT*².		• · 5INT*²

* : Female, ** : Male, *² : Interviews, FGD : Focus Group

The relevant health zones were identified using the Expanded Program on Immunization database. The two guides, one for the focus group and the other for the interviews, were prepared and then pre-tested in two health zones not included in our study. We also took this opportunity to test the reliability of the Dictaphone.

Data Analysis Techniques

The focus group discussions (FGDs) were transcribed and translated into French by the two research assistants, who alternated between these two tasks. A secretary prepared the transcripts in Microsoft Word. A.M. reviewed all the transcripts before analysis. Atlas Ti software was used to support data analysis and identify trends. This software allows researchers to organize and analyze complex and unstructured datasets by fragmenting and categorizing the data while maintaining a link to the source documents (the FGD transcripts in this case). The analysis itself is an inductive process that allows themes to emerge from the data. These themes are coded into categories that are continually refined throughout the analysis. Finally, relationships between the categories are established and inferences are drawn. The analysis and its process were discussed with the co-investigators. The focus group discussions (FGDs) were coded, with each element of the analysis representing a participant's

contribution to the group discussion. The codes were developed progressively and inductively, allowing relevant themes to emerge.

Ethical Considerations

Ethical Statement: The study protocol was approved by the Faculty of Public Health at the Official University of Mbujimayi in the Democratic Republic of Congo. Local community authorities were consulted for permission to conduct the study. Participants in the group discussions were informed that their participation was voluntary, as were those participating in the interviews.

Permission to record the conversations on magnetic media was requested before the start of each group discussion, as well as for the interviews with healthcare providers. The anonymity of the participants was guaranteed, and no personal details were recorded. Oral consent was obtained and audio-recorded before the start of each group discussion and interview. Oral consent was preferred given the low levels of regional literacy. This consent procedure was approved by the ethics committee.

These ethical considerations are in accordance with the Helsinki Declaration. (https://www.wma.net/fr/policies-post/declaration-dhelsinki-de-lamm-principes-ethiques-applicables-a-la-recherche-medicale-impliquant-des-etres-humains)

Results

We interviewed twenty-five healthcare providers and conducted six focus groups in the community with parents of children under five years old. The characteristics of the participants are shown in a table below.

1. Characteristics of participants in individual and group interviews

Table 1 : Characteristics of participants.

	Categories	Number	Sex		A.M.E.P.*
			Fem.	Male.	
Interviews	**Providers**	**25**	**8**	**17**	**12(8-17) years**
Focus Group	**Parents**	**54**	**27**	**27**	**--**

* : A.M.E.P. : Median year of professional experience

The median year of professional experience of the interviewed providers is 12 (8-17). This shows several years of experience in vaccination.

Several themes emerged from these individual and group interviews : (1) Knowledge of measles and vaccination ; (2) community perceptions of measles and vaccination ; (3) community practices on

treatment; (4) sources of information on measles in the community; (5) barriers to vaccination, treatment and elimination of measles; and (6) perceived factors for improving measles management.

2. Knowledge

2.1. Knowledge about Measles

In general, parents say that measles is a contagious and potentially fatal disease that absolutely requires treatment. As for healthcare providers (registered nurses), they have a good understanding of measles as a viral disease, recognized by simple signs. It can lead to malnutrition and further worsen the condition of the sick child. Their knowledge is enhanced by briefings and training sessions they regularly receive whenever a vaccination campaign is scheduled.

« *A contagious disease of children causing fever, redness of the mouth, and small spots on the body* » (FGD Women 1).

« *Measles is a viral disease diagnosed symptomatically. A sophisticated laboratory is not necessary; the signs are detected symptomatically, and the provider can then identify measles based on a single sign* »(INT 8).

This knowledge of measles includes understanding the signs of the disease and its mode of transmission, as illustrated by the following quotes from the majority of parents and healthcare providers ; they describe how they react to a suspected case :

« *Red eyes, fatigue in the child, red mouth, cough, and a rash all over the body are the known signs of measles* » (FGD Women 1).

« *Of course, because when a case is suspected, we are alerted and we also alert the health zone ; samples are taken, the diagnosis is made by the national laboratory in Kinshasa, and we report the information* » (INT 9).

Since transmission occurs through direct contact, here is what some parents say about it:

« *Knowing how to keep each child sick with measles away from others to prevent transmission* » (FGD Women 6).

2.2. Knowledge about Vaccination

Most parents know that vaccination is the only way to protect against measles. They believe that there have been fewer epidemics thanks to vaccination and that it provides increased protection against specific diseases. They say that vaccination is a good thing because it protects our children against many diseases.

« *The disease is there, you just have to get vaccinated, the child should get all the vaccines, especially the latest one against measles* » (FGD men 5).

Healthcare professionals reported that vaccination and awareness campaigns are free ; this is why parents should ensure their children receive all the necessary vaccinations.

« *The only prevention is vaccination, which is free ; health education is also free* » (INT 7).

3. Perceptions

a) Perceptions of Measles

Some parents believe that measles is an extraordinary illness, attributing it to another source and suggesting that its cure must be initially supernatural and then medical. For some, it is a disease caused by an evil spirit, while for others, family problems may be the cause. There are also those who believe that measles is a serious illness that can kill a child, especially if there are conflicts between the parents.

« *Measles can be caused by family problems, and the solution is to find a family agreement* » (FGD 5).

« *We are convinced that bad luck is at the root of measles* »(FGD 1).

The parents stressed that when a child shows signs of measles, a treatment should be sought, whether through medical care or any traditional or spiritual means, to alleviate the child's symptoms. They can go to the health center or use non-medical methods, as some believe the medical center is the best option, while others find medical treatment ineffective and prefer to turn to traditional or spiritual approaches.

« *The right approach when we see a child with these signs—skin rash, redness of the eyes and mouth, fever —is to send them to the center for treatment »* (FGD 1).

« *There are people who believe that prayer can protect against measles*.» *(*FGD 1).

Healthcare providers consider measles management a necessity, not only for their practice but especially for protecting children from measles. They are also committed to identifying all suspected cases, including those with incomplete vaccinations, completing the entire childhood vaccination schedule, and protecting the vast majority, if not all, of the age group covered by the Expanded Program on Immunization (EPI).

« *Yes, as clinicians, we treat measles not with the laboratory, but through clinical signs. The flowchart also helps us diagnose and treat the disease* » (INT 18).

b) Perceptions of Vaccination

Regarding parents' perceptions of vaccination, some blame the vaccine for worsening the condition of already sick children, without offering any alternative solutions. For them, the vaccine is less necessary.

Others believe that the vaccine is a poison that can kill children or make them sterile; they also say that the vaccine is useless and ineffective.

« *Mothers are ignorant ; we think the vaccine causes other illnesses simply because of the fever after injection* » (FGD 2).

« *The vaccine is a poison brought by white people to kill our children; the vaccine doesn't help at all* » (FGD 1).

4. Community Practices Regarding Treatment

The community uses certain specific practices. Even at the first sign of any skin rash, whether it is measles or not ; There is a way of acting within the community, either received from a parent who taught their children, or it is a common practice in a region, or it is learned through imitation.

a) Local Practices Regarding Skin Rashes

Many parents are aware of the signs of measles, and the majority cited skin rashes and redness of the eyes and mouth as signs of the disease. However, we sought to understand what they do when a child presents with a rash, whether it is a case of measles or not. A large number of them prefer traditional treatments such as applying and consuming certain purely local preparations, as traditional treatments use different types of plants, depending on whether one has been initiated or informed.

« Crushed leaves of 'mulemba' (Ficus thronninghii) are mixed with sugar and given to the child to drink, then the contents of an egg and crushed peanuts are applied » (FGD 2).

« They prefer to treat with local practices, applying margarine to the body instead of going to the hospital, believing they will be wasting money » (FGD 1).

b) Practices on the treatment of measles

The focus groups revealed that a large number believe measles is a serious illness with a mystical origin and that medicine cannot cure it; they believe that ancestral or traditional treatments can effectively cure this disease.

« They apply the traditional products 'Iwangadidi' (Phyllanthus muellerianus) and 'Dinkanga bakishi' (Chenopodium) to the child's body and give them a quantity to drink » (FGD 3).

« The practice of our ancestors which consists of tying a red thread around the hip to be protected by the ancestors » (FGD 1).

5. Barriers to Measles Vaccination, Treatment, and Elimination

a) Barriers to Vaccination

During our discussion, parents listed several other reasons that hinder vaccination. All of this stems from parental behavior and understanding; what they hear from those around them also impacts this behavior. Among these barriers, the most frequently cited are :

(1) Religions (the Apostolic Church "the Babas," Tsheba Ntshianyi, the Nguzas, etc.). These religions already prohibit them from going to hospitals, and their beliefs prevent them from seeking medical care or obtaining medication, let alone vaccines. « *The religion of "Tshebantshanyi," the Babas (Religion of the Apostles), and busy parents* » (FGD 2)

(2) Parental negligence and lack of interest. Families living in diamond mines don't have time for vaccination. « *Those who live in the diamond mines don't come to town, and there are other habits related to vaccine refusal, such as the father's disinterest.* » (FGD 2)

Healthcare providers here report several situations that prevent children from receiving the measles vaccine. Several barriers are cited, including parents' work (activities related to earning a living), religion, which creates pockets of resistance, the use of traditional remedies, and a lack of financial resources. Other factors include shortages of the measles vaccine, which occur occasionally in some health centers, and the COVID-19 pandemic, with its associated lockdowns and social distancing measures. Another statement mentions the ignorance of parents or caregivers.

« *There are also religions involved; some religions reject vaccination and create pockets of resistance to it." Poverty sometimes forces parents to leave their children behind in search of food. Other times, there are those who leave with their children on their backs, and we fail to catch them* » (INT 18).

Therefore, whether it is the service providers or the parents, the reasons given for missing measles vaccination are almost the same.

b) Barriers to Measles Treatment and Elimination

Parents, as the primary caregivers for their children, have opinions regarding measles treatment and elimination that reflect the basis of all traditional and other non-medical practices, sometimes fearing death falsely attributed to medical treatment. Some believe that there is no treatment for measles and that the disease itself is a curse cast upon the child. Other parents, however, refuse vaccination due to painful memories, or it is a family decision rooted in the past.

« *Family refusal due to the grandparent's experience; the vaccine had left them disabled* »(FGD 4).

Healthcare providers present reasons based on realities on the ground. They believe that failing to train those responsible for care—that is, themselves, the providers—would hinder the fight against measles. They demand the active participation of caregivers and adherence to the entire vaccination schedule, as prescribed for each child in the age group designated for the Expanded Program on Immunization (EPI). The most frequently cited barriers are :

(1) First barrier: parents' occupations,

(2) Second barrier: religion,

(3) Third barrier: financial constraints,

(4) Fourth barrier: beliefs;

« *The first obstacles are the parents' busy schedules; a child alone cannot come to the treatment center… the second obstacle is religion, and there are churches that say it's the devil's work, so we pray…and the third obstacle is the socio-economic situation… There are also the frequent shortages of medications, although with vaccines, this is almost always an issue; there's rarely a crisis* » (INT 10).

The reasons that hinder the treatment or elimination of measles are numerous. The factors enabling its elimination include financial cost, on which parents' opinions are divided. Some clearly state that treatment is expensive, while others say that all measles services are free and that the government has already made all the necessary provisions for this purpose.

« They always ask for money ; if it's a lot, I'd even mortgage one of his mother's loincloths, as long as the child gets treatment » (FGD 4).

« Regarding healthcare, we've already spoken with the community… they themselves provided what we need for good accessibility and attendance; they proposed a pricing structure for care, maternity care, and so on » (INT 25).

6. Sources of Information on Measles in the Community (Population)

Parents shared their sources of information with us ; where they first heard about measles. The responses were very diverse, although many said they learned about it through community health workers or nurses at the health center. Some learned about it through medical programs broadcast on various radio stations, and others because they themselves had the disease or a family member had suffered from measles. There were even parents who were informed of the existence of measles through an alert message on communication networks.

« *We were informed by the Community Health Workers who come around the* community » (FGD 1).

« *It was when my son had it that those who knew told me it was measles* » (FGD 2).

In this chapter on sources of information on measles, posters did not attract the attention of participants in our focus groups, yet it is one of the most used means by many health partners**.**

7. Perceived Factors for Improving Care

To improve care, the presence of a partner in a health zone offers many advantages for treating measles cases: measles control, cost, supplies, increased parental enthusiasm for vaccinating their children, and

the availability of necessary equipment.

Besides the partner, the Expanded Program on Immunization (EPI) is of great importance, as it makes supplies and equipment available. Thanks to this program, progress has been made in the fight against measles with the addition of a second dose (of the measles vaccine) at fifteen months, and it has helped to increase the number of vaccination sessions in some health centers.

Furthermore, the EPI and partners contribute to reducing measles mortality and morbidity and the persistence of the disease in the community. This is because care improves when resources are abundant :

(1) The parents agree that the care should be supported by paying the providers, and that vaccination and measles treatment should be free.

« *The partners should remember to pay the nurses well, even if the vaccination and treatment are free, they will do it properly* » (FGD F 1).

(2) The healthcare providers here specify that everything is going well with the program in place, hence their strong desire for health support.

« *With the Expanded Program on Immunization, things are going well because we conduct two to three vaccination sessions, and we always bring children to all of them. The program makes the necessary supplies available; the working tools such as forms and vaccination cards* » (INT 7).

Furthermore, parents are calling on the State, their own conscience, as well as mothers and all caregivers, not to skip, forget, or neglect vaccination appointments. The fight against measles remains a difficult task to which everyone involved must dedicate themselves.

« *Parents must take responsibility and not miss any vaccination appointments, especially* » (FGD 2).

« *The State must seek major partners who can take charge of these patients and properly compensate nurses and doctors so that the disease can end* » (FGD 3).

All healthcare providers are unanimous in their desire to eliminate measles.The State and its health partners must provide comprehensive support for measles management throughout the country in general and in Kasai-Oriental in particular.

« *We are asking the central government to provide essential measles medication to the health zone and to increase vaccination sessions… to definitively eliminate measles cases in our country, and in Mbuji-Mayi…* » (INT 15).

Some suggest that each child’s vaccination card be kept and presented whenever the child travels from one place to another, with mandatory school registration (starting with preschool).

« *…that the government require every child starting preschool or primary school to register with a fully completed vaccination record… And this should be part of their initial file… For every trip or journey, parents should first show a photocopy of their child's vaccination record, even for short distances* » (INT 18).

Discussion

The study showed that the measles surveillance system was poorly understood by the population and did not allow for the elimination of this disease. Most participants were aware of the existence of measles and the importance of vaccination, while some were unaware of both the severity of the disease and the importance of vaccination. Even some of the older respondents had little knowledge of measles and were completely unaware of its management.

1. Knowledge and Practices Regarding Measles and Vaccination

The results of our study show that parents are well aware of measles as a serious disease present in the population that kills children. They understand the importance of awareness campaigns and vaccination as effective means of preventing measles. They also know how measles is transmitted and how to treat it. They rightly appreciate the work done by healthcare providers in the fight against measles and other vaccine-preventable diseases. Our results differ from those found by other authors. Indeed, a study conducted in Sabah, Malaysia, found that most participants were completely unaware of the existence of measles, and some were unaware of both the disease and the importance of vaccination (11). In this same study, the concept of measles was virtually unknown even among participants with a high level of education (11). Similarly, existing studies of migrant communities in other countries report that more than half of the participants had little or no understanding of measles (12, 13). Only a few respondents lacked knowledge about measles, while most believed that children with measles simply had a rash (11). Those interviewed in the same study in Malaysia did not consider measles to be a serious illness that could endanger the lives of their children (11). A study conducted in the United Kingdom also revealed that the general public is unaware that measles can be fatal and lead to serious complications (14). Pneumonia has been reported as a common and fatal complication in unvaccinated children under five years of age with measles (15). Most respondents in Malaysia believed that measles vaccination is necessary for their children's health (11). Consequently, a low perception of the severity of the disease and its associated risks, coupled with complacency, leads to lower vaccination coverage (14). Childhood vaccination is an effective way to prevent serious childhood illnesses (11), including measles.

We believe this discrepancy in perceptions stems from the fact that the study in Malaysia was conducted among marginalized populations, who are prevented from learning more about measles due to their circumstances. They lack the resources and freedom to learn and access information. Knowledge of measles is not a function of socioeconomic status, but rather of the strategies implemented by the health system. It also depends on the level of communication and awareness campaigns about measles. In our study, parents were well-informed and even confirmed that the only way to prevent measles was through vaccination. This assertion was also observed among healthcare

providers, who all confirmed that effective prevention came from vaccination. Regardless of the approach taken against measles, nothing is better than prevention through vaccination. Parents confirmed that vaccination is the best way to combat and protect against the disease. Participants in our study reported this stance taken by members of the Apostolic sect, who refuse all vaccinations and/or medical treatment. However, we observed that some members of this sect accepted vaccination outside of working hours and discreetly. Sometimes they accepted it under pressure from state authorities.

In Zimbabwe, some people were forced to accept vaccination after experiencing a death in their family from measles or if it was administered privately. The level of vaccine acceptance among the various sects of the Apostolic Church varies greatly, ranging from complete intolerance to vaccination (16). Zimbabwean parents and guardians are major centers of resistance to vaccination. They accept vaccination when the police are involved or under strong government involvement and the use of law enforcement (16). In some countries around the world, mandatory vaccination strategies have been implemented in response to declining vaccination coverage and the resurgence of measles due to vaccine hesitancy and the anti-vaccination movement. In Italy, for example, where poor results have been observed, vaccination was added to the list of mandatory vaccines in 2017, and proof of vaccination is required to attend preschool, daycare, and primary or secondary school (17). There are opposing views on measles vaccination among the population. Some believe the measles vaccine is safe and effectively immunizes children, while others disagree because they were skeptical of COVID-19 vaccines and have extended this skepticism to other vaccines, such as the measles vaccine (18). Thus, the COVID-19 pandemic has also changed parents' attitudes toward childhood vaccinations (19).

In Conakry, in an urban study, the majority of healthcare workers recognized the benefits of vaccines and believed that there were fewer outbreaks thanks to vaccination. Some divergent perspectives on the perceived benefit of vaccination were described by a small number of healthcare workers, in which vaccines were described as causing or exacerbating the disease (20). In our country, in Oisha, South Kivu, a study also revealed that 39.2% of respondents felt that the vaccine was not necessary, 60.8% felt that the vaccine was necessary, and 42.3% felt that the vaccine was dangerous, while 57.7% felt that the vaccine was not dangerous (21).

Following this discussion, we endorse the approach of some healthcare providers who have increased the number of routine vaccination days. The work of community health workers, monitoring, and reminders are essential to ensure vaccination is carried out. Skepticism surrounding the COVID-19 vaccine did not impact parental acceptance of the measles vaccine, but rather the lockdown period and all the associated measures that affected adherence to the vaccination schedule. This situation led some parents to forget to get their missed measles vaccinations. Vaccination remains necessary, less dangerous, and the only way to protect children under 59 months against measles.

2. Perceptions and Perspectives on Vaccination

Regarding methods of measles prevention and control, all healthcare providers unanimously agree that measles must be eliminated and that children should no longer suffer from this disease. They urge the State to take responsibility and call upon parents to take action. They want vaccination coverage to be improved. The vast majority believe that vaccination remains the ideal way to combat measles. They call for free healthcare, an uninterrupted supply of essential supplies, and well-trained and well-paid staff for quality work. These perspectives will change things.

In Zimbabwe, the medical community is considering partnering with community members such as health workers and traditional healers or "chidzidzo" (local health workers who provide community-based medicine to the Apostolic community), who are respected and influential members of the Apostolic community, to offer vaccinations. Above all, staff of the Expanded Programme on Immunization (EPI) advocate for more training, education, and awareness-raising (16) to successfully implement prevention methods for effective measles control and widespread vaccination. In the same study, the authors suggest that religious leaders and community leaders should be involved, but EPI staff believe the government must intervene and has the power to influence religious leaders, who themselves acknowledged their respect for the government during interviews (16). All these perspectives point towards prioritizing vaccination, whether in Mbuji-Mayi (in the Democratic Republic of Congo) or Zimbabwe. In a study conducted in Malaysia, most respondents believed that community volunteerism would increase measles vaccination uptake; their expectations for the program indicate that some barriers to vaccination could be overcome once it is launched. After all, telephone reminders have indeed improved vaccination coverage in low- and middle-income countries (22). In Guinea, some healthcare workers say there is insufficient information about the benefits of the vaccine and its role in disease control ; they want more training (20). This recommendation has been reported in other studies conducted in contexts different from Guinea, including among mothers in the United States (23) and healthcare workers in South Africa (24).

In a study conducted in Kashmir, India, respondents felt that the measles surveillance system was inadequate and needed improvement for proper control and information sharing ; improved coordination and information sharing among the different branches of the health system are necessary to build an organized measles surveillance system (25). Participants in our study expressed the need to intensify measles surveillance activities and the need for local laboratory confirmation of suspected measles cases. These factors for intensifying measles surveillance suggested by our study respondents are consistent with the findings on strengthening factors reported in research that found that Cuba, another developing country, had opted for intensified measles surveillance activities and had experienced an interruption of measles transmission since the late 1980s; similar successes were achieved in Haiti, Venezuela, and Colombia in 2002 (26).

3. Factors influencing the persistence of measles epidemics.

Alongside all these perspectives on measles prevention methods, there are socio-cultural factors that influence the persistence of measles epidemics in the population. These factors are cited by both

healthcare providers and parents. These barriers include, in particular, vaccination, treatment of suspected and confirmed cases, and measles elimination.

The barriers listed by our respondents are numerous: neglect, parental illiteracy, lack of financial resources, parents' occupations (survival activities), and forgetting appointment dates. Refusals due to religion, the most prevalent being the religion of the apostles, known as the "Babas" or "Bapostolos" here in Mbujimayi (a sect originating in Zimbabwe and widespread in many African countries, including the Democratic Republic of Congo), have created some pockets of resistance. Refusals stem from a parent's negative experience with the MAPI vaccine at the time of vaccination. Technical issues related to vaccine shortages, the lack of cold chain maintenance in some health centers, and the COVID-19 pandemic also contributed. Other reasons cited by parents included distance, inaccessibility of vaccination sites due to ravines, poor knowledge of the vaccine, and the expectation of gifts in exchange for vaccination. These barriers are similar to those cited in Malaysia, but here there is another aspect : in that country, women lack the autonomy to decide on their children's vaccination status (27). Most Malaysian parents also express concerns about the safety, side effects, and effectiveness of vaccines (28). In this study, it was difficult for undocumented migrants to vaccinate their children because they lack funds and proof of legal citizenship and face language barriers, COVID-19 issues, and weather-related obstacles to accessing healthcare services (27). The most common reason parents fail to fully vaccinate their children is also busy work schedules and forgetting vaccination appointments (29). A nomadic lifestyle also presents a barrier to increasing vaccination rates. Similarly, a study conducted in Indonesia found that one of the biggest barriers women faced when trying to vaccinate their children was opposition from their partners (30), while a Ghanaian study found that women’s unequal position in society limits their ability to make healthcare decisions, even for themselves (31). This finding was not mentioned at all in our study and appears to contradict the participants’ opinion, who confirmed that any parent, even a family member, can make a decision to take the child to the hospital or center to receive their vaccination. According to Mulders et al, in Burkina Faso, barriers to vaccination are facilitated by the fact that the measles vaccine occupies the last place in the vaccination schedule and are also accentuated by mothers' ignorance of the vaccination schedule due to a lack of parental awareness of the importance of vaccination (32). This situation is believed to be at the root of a measles epidemic that occurred in 2001 in Burkina Faso in the rural province of Houet, where 82% of measles cases had not been vaccinated (32). Mumbere M. et al. further confirmed in a study conducted in the Oisha health zone of South Kivu that 40.3% stated that the vaccine was contrary to their beliefs, 55.3% indicated that they were required to pay for the vaccine, and 60.8% stated that the vaccine was not often available at the nearest health center (21), opinions that support some of the statements made by our respondents. The study conducted in Zimbabwe showed that religious leaders indicated that their religion prohibited vaccination and also demonstrated the limited knowledge of religious leaders regarding vaccines ; they showed a poor understanding and lack of appreciation of vaccine efficacy (16). In Guinea Conakry, a study confirmed that key informants made numerous references to "religion" and "illiteracy" within communities as reasons for low vaccination rates (20). Several studies have also cited and specified that religion is considered a common obstacle to vaccination in different countries (33, 34). This reality

coincides with the statements of the participants in our study, who declared that religion and illiteracy are barriers to vaccination. For Khalid Bashir et al., in a study conducted in Kashmir, found that the number of barriers to measles surveillance is virtually unknown to healthcare professionals. Furthermore, a clear and explicit understanding was lacking due to insufficient knowledge and adequate training. Clearly, a lack of logistics and incentives was another obstacle hindering measles surveillance (25).

Overall, these findings suggest an urgent need to better organize and fund vaccination activities to achieve the established vaccination targets (35) of zero measles cases by 2030, particularly in the urban areas of Mbuji-Mayi and Kasai-Oriental in general.

Conclusion

Measles morbidity and mortality constitute a public health problem in our community. To reduce it, we recommend improving the positive perception of vaccines. It is essential to continue involving key individuals, such as parents, religious leaders, and political, administrative, and police authorities, in raising awareness about vaccination and disseminating messages that enable parents to adhere to the vaccination schedule.

The respondents have a good understanding of measles, but vaccination practices are neglected (low). However, the outlook is better for healthcare providers compared to parents.

This study fills a significant gap in the existing literature on the perceptions of measles and vaccination among parents and caregivers in our community. Our results also provide a better understanding of why measles persists in the population, with all the suffering that this entails.

Abbreviations

%: Percentage

≥: Greater than or equal to

°C: Degrees Celsius

RNA: Ribonucleic Acid

CDC: Centers for Disease Control and Prevention

COVID-19: Coronavirus 2019

DPS: Provincial Health Division

FGD: Focus Group Discussion

Ha: Hectare

INRB: National Institute of Biological Research

INT: Interview

Km: Kilometer

Km²: Square Kilometer

KOR: Kasai-Oriental Province

MAPI: Post-Injection Manifestations

MCV 1: Meningococcal Conjugate Vaccine Serogroup C, 1

MCV 2: Meningococcal Conjugate Vaccine Serogroup C, 2

MD : Doctor of Medecine

MDG: Millennium Development Goal

MPH : Master of public health

MSc : Mastre en Sciences

WHO: World Health Organization

NGO: Non-Governmental Organization

EPI: Expanded Programme on Immunization Expanded Program on Immunization

PRECODESA: President of the Health Committee

DRC (DR Congo): Democratic Republic of Congo

T1: Incidence Rate

USA: United States of America

ZS: Health Zone

Declarations

- **Ethical approval and consent to participate**

- Yes, it was the ethics committee of the Official University of Mbujimayi that approved our research.

- We obtained informed consent from all participants in our study.

- **Consent to publication**

- All the authors agreed in favor of publishing this article

- **Data and hardware availability**

The interview guides and the focus group guide were designed only for this study; they have never been published (they can be found in the supplementary files).

- **Conflicts of interest**:

No conflicts of interest between the different authors are to be reported here, each had their specific task and everything went well.

- **Funding:**

This work received no funding from anyone; the principal author alone bore the cost.

- **Author contributions:**
- Benoit Kazadi : wrote the main text, conducted fieldwork, and analyzed the data.
- Alain Mpanya : coordinated the results and discussion of the qualitative study.
- Criss Koba : read and corrected the introduction and methodology sections of the manuscript.
- Désiré Baloji : assisted with data analysis.
- Mutombo Kabamba : proofread the entire text.
- Pascal Lutumba : directed and supervised the entire project.

All authors reviewed the manuscript.

- **Acknowledgements:**

We thank all those who made the existence of this article possible, particularly all the authors who participated in its conception, writing, data analysis and correction; as well as the entire BMC team who are working towards its possible publication.

FINANCING STATEMENT.

This work has not benefited from any particular funding; it is the fruit of our love and our contribution to research.

"CLINICAL TRIAL : Not applicable."

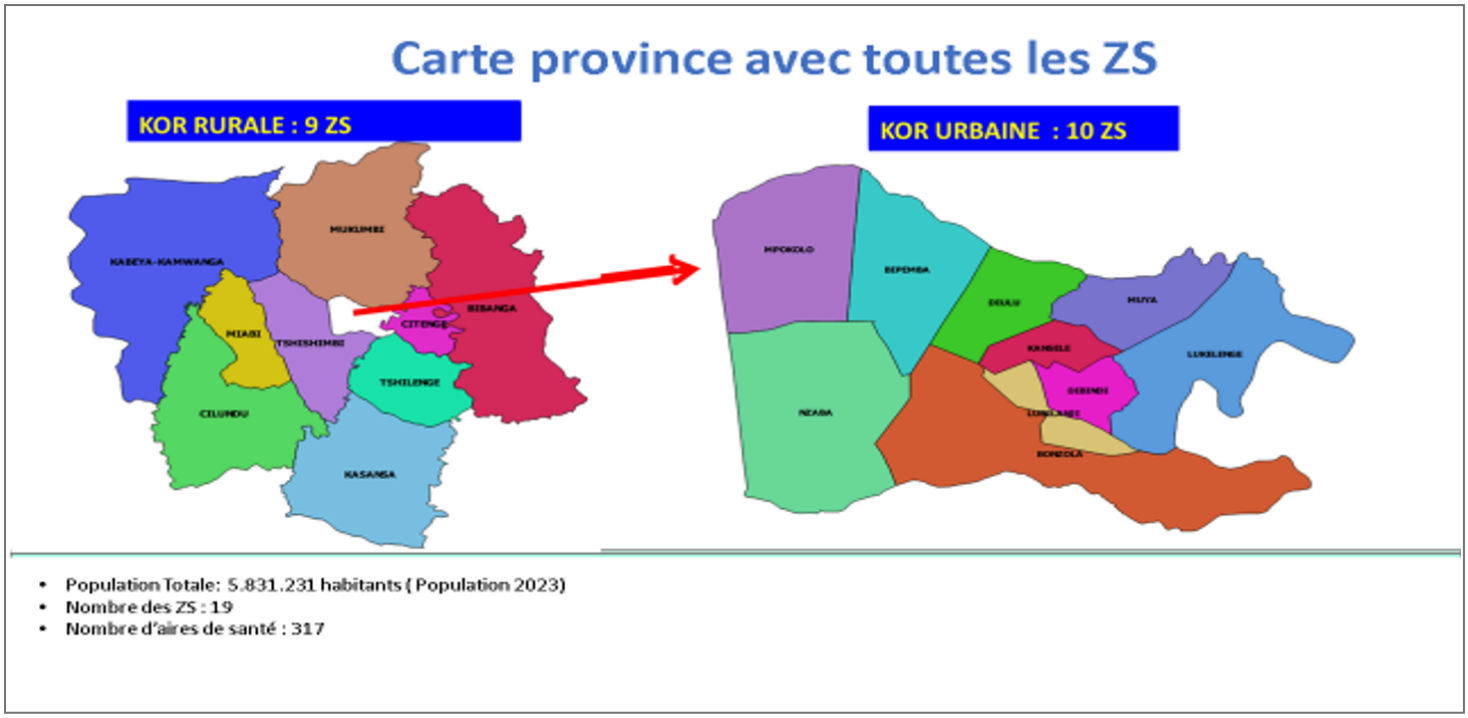
References

1. Gonçalo FA, Diogo C. Definition of a difficult case of measles: three measles outbreaks in three health regions of Portugal. 2018.
2. WHO. Press release, New York/Geneva/Atlanta, November 2020.
3. Donna Barnes, Wadhwa D. World Bank Review. 2019.
4. Walekhwa AW, Ntaro M, Kawungezi PC, Achangwa C, Muhindo R, Baguma E, et al. Measles outbreak in Western Uganda : a case-control study. BMC Infect Dis. 2021 ;21(1) :596.
5. WHO. Progress in the global fight against measles and regional elimination of measles 2000-2011. Geneva : World Health Organization; 2013.
6. Provincial Health Division/K-OR DPdl. Measles in Kasai-Oriental, Democratic Republic of Congo. 2022.
7. Strebel PM, Cochi SL, Hoekstra E, Rota PA, Featherstone D, WJ B, et al. World without Measles, J Infect Dis.; 204(suppl 1): S1-3. PubMed 2011.
8. Control ; CoDa. Global control and regional elimination of measles, 2000-2011 ; 2013.
9. WHO, Pan American Health Organization, Cedpedcd. Weekly Bulletin on Epidemics and Other Emergencies. Brazzaville : WHO Regional Office for Africa.
10. Pierre A, Gaüzère B-A. Measles - News 2023. René Labusquière Center, Institute of Tropical Medicine, University of Bordeaux, 33076 Bordeaux (France) 2023.
11. Salleh H, Avoi R, Abdul Karim H, Osman S, Dhanaraj P, Ab Rahman MA. A Behavioral-Theory-Based Qualitative Study of the Beliefs and Perceptions of Marginalized Populations towards Community Volunteering to Increase Measles Immunization Coverage in Sabah, Malaysia. Vaccines. 2023 ;11(6).
12. Hu X, Xiao S, Chen B, Sa Z. Gaps in the 2010 measles SIA coverage among migrant children in Beijing : evidence from a parental survey. Vaccinated. 2012 ;30(39) :5721-5.
13. Trivedi R, Singh S, Adhikari P, Jatav DP. Coverage evaluation of primary immunization and the associated determinants in an urban slum of Rewa. Indian Journal of Community Health. 2014 ;26(1) :37-40.
14. Thompson S, Meyer JC, Burnett RJ, Campbell SM. Mitigating Vaccine Hesitancy and Building Trust to Prevent Future Measles Outbreaks in England. Vaccines. 2023 ;11(2).
15. Ullah HK, Shahid Khan, Jafar Iqbal, Muhammad Tayyeb, Shah Fahad, Amen. Prevalence of pneumonia associated with measles among infants and children hospitalized in Khyber Teaching Hospital Peshawar, KPK, Pakistan. Pure and Applied Biology (PAB). 2021(3) :703-12%V 10.
16. Machekanyanga Z, Ndiaye S, Gerede R, Chindedza K, Chigodo C, Shibeshi ME, et al. Qualitative Assessment of Vaccination Hesitancy Among Members of the Apostolic Church of Zimbabwe : A Case Study. Journal of Religion and Health. 2017 ;56(5) :1683-91.
17. Florence Kauffmann, Catherine Heffernan, François Meurice, Martin OC Ota, Volker Vetter, Casabona G. Prevention of Measles, Mumps, and Rubella: How Can We Do Better? Pages 811-26.

18. Amanna IJ, Messaoudi I, Slifka MK. Protective Immunity Following Vaccination : How Is It Defined? Human Vaccines. 2008 ;4(4) :316-9.
19. Elbert B, Zainumi CM, Pujiastuti RAD, Yaznil MR, Yanni GN, Alona I, et al. Mothers' knowledge, attitude, and behavior regarding child immunization, and the association with child immunization status in Medan City during the COVID-19 pandemic. IJID regions. 2023 ;8(Suppl): S22-6.
20. Julita Gil Cuesta, Katherine Whitehouse, Salimou Kaba, Kassi Nanan-N'Zeth, Benoit Haba, Catherine Bachy, et al. "When we welcome well, we vaccinate well": a qualitative study on improving vaccination coverage in an urban setting in Conakry, Republic of Guinea.; 8643481.
21. Mumbere Mukemay Munene1, Kambale Isemighambo Anaclet, Kakule Muyonga Isaac, ; SOL. Factors Associated with the Emergence of the Measles Epidemic in the Oicha Health Zone ; © 2022 Scholar AI LLC International Journal of Progressive Sciences and Technologies (IJPSAT); 2022. pp. 210-7.
22. Harvey H., Reissland N., J. M. Parental reminder, recall and educational interventions to improve early childhood immunization uptake: A systematic review and meta-analysis. 2015. pp. 2862–80.
23. Alstyne JAM, Nowak GJ, AA. What is “trust” and what might influence it?: A qualitative study of vaccine-hesitant mothers. Vaccin 2018. p. 44.
24. Helman CG YP. Perceptions of childhood vaccination in rural areas of the Transkei - a qualitative study. S Afr Med J 2004.
25. Khalid Bashir , Khurshid Ahmad Wani , Mariya Amin Qurieshi , S Muhammad Salim Khan , ; IH. Measles surveillance in Kashmir : A mixed methods study. 2022. p. :251-6.
26. De Quadros, Ca ; Can measles be eradicated globally? : Bull World Health Organ. ; ; 2004.
27. Steven M.C., Yusof M., Ibrahim H., Karim H.A., Dhanaraj P., ; MKA. Barriers and Drivers towards the Use of Childhood Vaccination Services by Undocumented Migrant Caregivers in Sabah, Malaysia : A Qualitative Analysis. 2021 ;15 :247–56.
28. Mohd Azizi FS, Kew Y, Moy FM. Vaccine hesitancy among parents in a multi-ethnic country, Malaysia. Vaccinated. 2017 ;35(22) :2955-61.
29. Lim WY, Amar-Singh HSS, Jeganathan N., Rahmat H., Mustafa NA, Mohd Yusof F.-S., et al. Exploring parental vaccination refusal in the Malaysian context. Cogent Med. 2016. p. 3
30. Widayanti A.W., Norris P., Green J.A., S.H, Is expanding service through an outreach program enough to improve immunization uptake? A qualitative study in Indonesia. 2020 ;15 :1168–81.
31. Budu E., Seidu A.A., Armah-Ansah E.K., Sambah F., Baatiema L., B.O. A. Women’s autonomy in healthcare decision-making and healthcare seeking behavior for childhood illness in Ghana : Analysis of data from the 2014 Ghana Demographic and Health Survey. 2020. p. 15.
32. Mulders MN, Nebie YK, Fack F, Kapitanyuk T, Sanou O, DC. V. Limited Diversity of Measles Field Isolates after a National Immunization Day in Burkina Faso : Progress for Endemic to Epidemic Transmission ? The Journal of Infectious Diseases. ; 2003. p. 18.

33. Larson HJ, Figueiredo AD, Xiahong Z, al. e. The State of Vaccine Confidence 2016 : Global Insights from a Survey in 67 Countries [Free PMC Article] 2016. pp. 295–301.
34. Marti M, Cola MD, Macdonald NE, et al. e. Global Factors of Vaccine Hesitancy in 2014 – Beyond Safety Concerns. [Free PMC Article] 2017. pp. 1–12.
35. Abel Wilson Walekhwa, David Musoke, Aisha Nalugya, Claire Biribawa, Godfrey Nsereko, Solomon Tsebeni Wafula, et al. Gaps in Measles Immunization Coverage in Kasese District, Western Uganda : Results of a Qualitative Assessment. 2020.

Figures



Source : DPS/Kasai-Oriental, Health Zone Visibility of the Province, 2023.

Figure 1

Legend not included with this version.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- GUIDEFGEnglish.pdf
- GUIDEMEDICALSTAFF.pdf